SANITARY EXAMINATIONS OF WATER, AIR, AND FOOD.

THE first edition of this book, which appeared in 1878, supplied a want, which had long been felt by health-officers, for a book which would help them to solve the problems which presented themselves for solution almost daily in their efforts to provide, for those committed to their care, pure water, air, and food. Dr. Fox's brochure on water-analysis was recognized as a work of great value, and two editions of it had been exhausted. When a third edition was called for, its scope was extended by adding sections on the examination of air and food. In the section devoted to the sanitary examination of drinking-water, we find all the well-known tests for the determination of organic matter, and, in addition, the biological method of Koch, which, in Germany at least, is regarded as being as important as the chemical analysis. Chemistry gives no indication of the presence or the number of micro-organisms; and there is no doubt that water has been declared suitable for drinking-purposes, as a result of chemical analysis, when, had the biological method been known and employed, a far different opinion as to its potability would have been given.

The determination of the nature and life-history of the microbes found in water is too difficult for the health-officer, unless he be at the same time a bacteriologist, and so situated as to be able to investigate them in a properly equipped laboratory; but the ability to ascertain whether their number in a given water is beyond the normal amount is certainly within his reach. The methods to be employed in such an examination are fully described, and the apparatus abundantly illustrated, in the work before us. In a table given by the author, showing of what this method is capable, it is observed that the number of micro-organisms in the different metropolitan waters varies markedly at different seasons, and in the waters as compared with each other. In the water of the Thames at Chelsea, in January, there were 8 in one cubic centimetre; in February, 23; in June, 81; in September, 13; and in November, 3. In the water of the River Lea there were 25 in January, 121 in May, and 317 in December. The water of the Kent company leaves the well almost wholly destitute of organic life, and the few organisms which it contains are imported into it *en route* to its supply.

In the chapter descriptive of the microscopic examination of water there is much that is valuable. By the aid of the microscope, an approximate estimate may be made of the number of micro-organisms and the diagnosis of the kind,—whether bacteria, bacilli, micrococci, vibrios, spirilla, etc. The kind of animal and vegetable life seen in water gives a certain clew to the description of the water under examination. The Infusoriae, Confervae, and Vorticellae are the inhabitants of the least pure of spring-waters; then come the diatoms and desmids; Entomostraca, or water-fleas, are seen in spring-ponds, lochs, and impounded waters; euplota and fungoid growths abound in ditch and pond waters, and in well-water polluted with filth; whilst bacteria, paramecia, and spirilla are prominent in sewage-polluted water. Dr. Frankland regards the presence of any thing like a moving organism in a water as a danger-signal, for the reason that, if the poisons of such diseases as cholera and typhoid-fever attach themselves to particles of organic matter, and can operate in inconceivably minute quantities, as is generally believed, there is a possibility of the disease-ferment or germ of such maladies accompanying elementary forms of life. Two plates are given of microscopic objects found in drinking-water.

In the section which takes up the sanitary examination of air, the author describes the various impurities found in air which render it unfit for respiration, including sewage emanations, poisonous gases and injurious vapors, emanations from ground having damp and filthy subsoil, and from churchyards, and the deleterious effects on health of impure air in our houses. The methods for the detection and estimation of the amount of the most important impurities found in the air are fully dealt with, including both the microscopical and biological methods. Chapters are also devoted to ozone, temperature, solar radiation, barometric pressure of the air, direction of the wind, etc., and their relations to health.

One of the most interesting chapters in the book is that which treats of the meteorological conditions which appear to favor or retard the development of certain diseases. Of these, twenty-one are mentioned,—surgical fever and shock after operations, small-pox, measles, whooping-cough, scarlet-fever, typhus, typhoid, intermittent fever, diarrhoea, dysentery, cholera, bronchitis, pneumonia, asthma, phthisis, diphtheria, hydrophobia, erysipelas, puerperal fever, insanity, and rheumatism. Small-pox has been found, in London and in Sweden, to prevail more from November to May than from May to November. Measles is most prevalent towards the end of March: it gradually declines, and by midsummer disappears. Diarrhoea is a summer-autumn complaint, and typhoid a late-autumn fever. The latter is more prevalent after dry and hot summers than after those which

Sanitary examinations of water, air, and food. By CORNELIUS B. FOX. 2d ed. Philadelphia, Blakiston. 12°.

are cool and wet. Bronchitis, pneumonia, and asthma increase as the temperature falls, and diminish as it rises. The damp, cold days of November, and the dry, cold days of the early months of the year, have been most prolific in cases of diphtheria. As to hydrophobia, the hot 'dog-days' of summer are generally considered to be those during which this disease is most prevalent; and this ancient belief is justified to some extent by facts, although we must remember that it shows itself to be independent, in its spread, of a high temperature, as the mortality in London during thirty years proves. The number of cases is as numerous in December as in August. More persons, doubtless, are bitten by dogs in hot weather, because dogs are more irritable during this season. We want an answer to the query as to the percentage of cases of hydrophobia in those who are bitten in each month of the year, before we can determine with certainty the influence of meteorological conditions on the disease. In this section are also given directions for observing the meteorological states and variations in the conditions of the air, as to its pressure, temperature, and moisture, the direction and strength of the wind, and its electrical state.

The last section of the book is taken up with a consideration of the food, its impurities, and methods of inspection and examination, including the inspection of meat, poultry, game, fish, fruit, and vegetables. Separate chapters are devoted to tinned provisions, corn, flour, bread, and milk. On the subject of tinned provisions, or 'canned goods,' as we should call them, Dr. Fox says that preserved Australian meats, and American tinned fish, fruit, etc., are apt to become impregnated with small quantities of lead from the solder and tin, which frequently contain, as impurities, arsenic and antimony. The vegetable and other acids associated with these provisions have a corrosive effect, which is increased by the galvanic action set up between the metals. In the chapters on milk and its examination the author gives numerous instances of disease caused by impure milk or by that from sick cows. The evidence that tuberculosis may be thus communicated is very striking and very convincing, if, indeed, there be any at the present day who, having given the subject any consideration, doubt it. Taken as a whole, this work of Dr. Fox is an excellent one, and should be in the library of every sanitarian and physician.

A PHYSICIAN of Caracas reports, that, during an epidemic of yellow-fever which occurred in that place, one of the victims was a monkey. After an illness of four days, the fever proved fatal.

SCIENTIFIC WRITINGS OF JOSEPH HENRY.

AT last, although somewhat tardily, as it has seemed to many, the regents of the Smithsonian institution, by the publication of these volumes, have enabled the general public to form a correct estimate of the great services of its first secretary, and have justified the opinion, long held by many of his countrymen, that Joseph Henry was unquestionably the first American physicist of his time. The Smithsonian institution, with the national museum, has been generally recognized as a monument to his wisdom, foresight, and patriotic self-sacrifice. How great this sacrifice was, demanding, as it did, almost total neglect of original research, — which he so loved, and for which he was so well fitted, — will be clearly understood on a perusal of these volumes.

The published papers of Henry, especially the earlier, and in many respects the most valuable, have long been well-nigh inaccessible. In later years he was too busy to follow the example of other eminent philosophers in collecting, editing, and republishing the work of his early years. Although an avenue for such reproduction of his numerous contributions to science was always open to him in the publication department of the Smithsonian institution, he never consented to utilize the facilities which he had so thoughtfully perfected for his fellow-workers, and which have proved such a boon to science and to scientific men.

The two handsome volumes now issued, naturally include a wide variety of subjects. The collection of papers is divided into two parts: a chronological arrangement is, in general, followed. But in order to equalize the size of the two volumes, the elaborate studies of and reports upon various phenomena connected with the transmission of sound, made between 1873 and 1877, while Henry was a member of the lighthouse board, are inserted out of their regular order, in the first volume.

Part i. includes papers published while a professor at Albany and afterwards at Princeton. This record covers a period of twenty-three years, from 1824 to 1846. It is contained in the first 260 pages of the first volume. Part ii. contains his scientific work during the remaining thirty-two years of his life, while director of the Smithsonian institution, from 1847 to 1878. Physicists will generally be most interested in part i., which contains nearly all of his original researches in electricity.

Born only five years later than Faraday, much

Scientific writings of Joseph Henry. 2 vols. Washington, Smithsonian institution. 8°.